

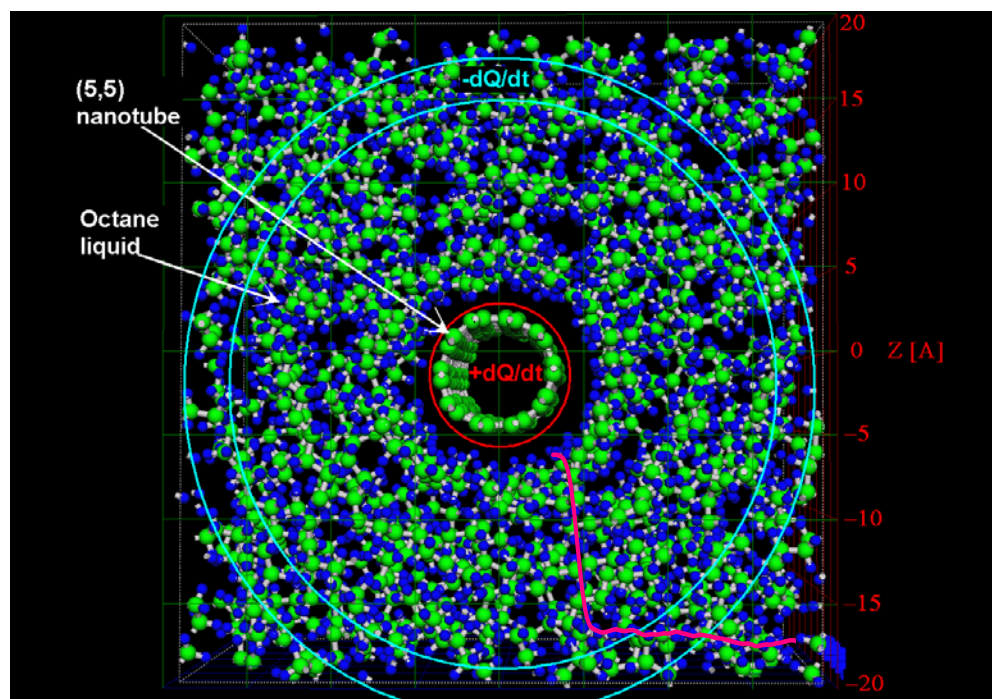
# Microstructure-Property Relationship in Carbon-based Nanostructures

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Carbon nanotubes have very high thermal conductivity and enormous aspect ratio. This should lead to great enhancements of thermal conductivity of composite materials filled even with small amounts of nanotubes. Numerous experiments, however, show order of magnitude lower than expected enhancements.

Molecular modeling performed by RPI researchers demonstrated that the high resistance to the heat flow across tube-matrix interface is responsible for the observed behavior.

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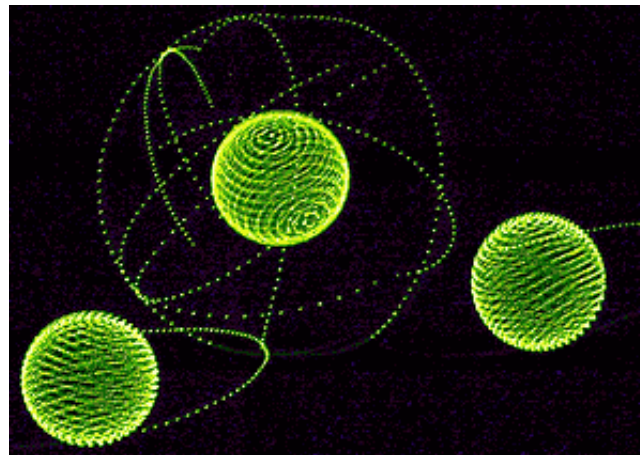


Snapshot of atomic positions of a carbon nanotube immersed in octane liquid. When the tube is heated at constant rate and the heat is removed from the liquid at the same rate a steady temperature profile develops (pink curve) with most of the temperature drop occurring at the tube-liquid interface.

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Our highlight education related activity is the “Molecularium” project, that we have developed jointly with Drs. Schadler and Garde (both RPI); This project is primarily supported the NSF funded RPI NSEC program. We created a 7-minute pilot of the show that teaches children about atoms and molecules using a dome theater and molecular scale simulations. The fun, as learning process, the students have during a molecularium show as well as during pre and post show activities is wonderful to see.



The show “Tour of the Molecular World” was premiered on Dec 11<sup>th</sup> 2002 in Junior Museum, Troy, NY. Kids participated in pre and post show fun activities that helped them learn preliminary molecular concepts.